PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Arctic Energy Office

03/2005

CHARACTERIZATION OF ALASKAN NORTH SLOPE LAKES

PARTNERS

University of Alaska Fairbanks
Fairbanks, AK

COLLABORATORS

GW Scientific

BP Exploration

ConocoPhillips Alaska

Bureau of Land Management, Alaska

Dept. of Natural Resources
Anchorage, AK

North Slope Borough
Barrow, AK

MAIN SITE

North Slope, AK

Background/Problem

Constructing ice roads and pads increases oil-field operators access for exploration with little or no environmental disturbance. If a discovery is made and development is warranted and approved, ice roads and pads can be used to reduce gravel roads and pads needed to support production facilities and pipelines. Construction of ice-roads and pads begins in December or January, when the tundra is adequately frozen to support ice road construction. Traffic can continue on ice roads through April, depending on the weather conditions. Water supplies are additionally needed to support facility operations.

Numerous questions exist regarding potential environmental consequences of such pumping, particularly because of the little water flow on the North Slope except during spring snowmelt. Possible effects include impacts to water balances, aquatic organisms (including fish and invertebrates), and like- water chemistry.

Project Description/Accomplishments

In the Fall of 2002, the University of Alaska Fairbanks, Water and Environmental Research Center, together with other project cooperators, initiated a study to obtain baseline information about the physical, biological, and chemical characteristics of North Slope Lakes in order to help assess some of the major questions related to lake water use. Automated data collection stations on lakes provide hourly data which is updated on the project Internet site at hourly intervals.

The study requires a complete understanding of the watershed hydrology at pumped and undisturbed lakes to quantify the potential impacts of water use. Continuous monitoring of selected hydrologic parameters and periodic sampling of water chemistry has been established for all test lakes (four pumped lakes and one control lake). The project established requirements for the selection of lake size, fish population present, watershed characteristics, and logistic access.

Criteria for evaluation included: meteorological stations to calculate evaporative and condensation water flux; monitoring influx and outflow of streams entering or leaving ponds, ground water flux, and precipitation; monitoring changes in pond water volume during spring recharge and summer evaporative drawdown; monitoring the volume of pumped water, determining the spring snowpack water within the pond watershed area; monitoring snowmelt processes; real time monitoring of meteorological conditions, pond levels, temperature.

CONTACTS

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COST

Total Project Value
$1,400,000

DOE/Non-DOE Share
$800,000/$600,000

CUSTOMER SERVICE

1-800-553-7681

WEBSITE

www.netl.doe.gov

Highlights of the 2004 season included: completion of an annotated bibliography of North Slope water withdrawal and tundra lakes (BP Exploration); addition of a study lake at the Alpine Facility (ConocoPhillips); addition of a study lake in NPRA (BLM); Defined the importance of watershed areas for determine recharge in the permit process; The North Slope Borough provided communication resources for new western lakes. .

Benefits/Impacts

The study has ensured that it will be of greatest benefit to the society as a whole by the participation of the entire scientific community, the oil industry and environmental focus groups. The project is accessing the environmental impacts of pumping greater than 15 percent of the free water from ponds on the North Slope for use in building ice roads to protect the tundra.

Establishment of the safe amount of lake-water to be pumped from North Slope ponds and lakes is vital to the continued development and production of oil and gas and the economy of Alaska. The issue will become increasingly important as development in NPRA and other areas to the west of Prudhoe Bay continues.

Ice roads are constructed using water pumped from local lakes and ponds—this is a picture of an ice road under construction.